What is claimed is:

1. A method for promoting growth of bone, ligament, or cartilage in a mammal comprising administering to said mammal a composition comprising:

a pharmacologically effective amount of a dimeric protein comprising residues 235-345 of SEQ ID NO:2 or SEQ ID NO:4; and

a pharmaceutically acceptable delivery vehicle.

2. The method of claim 1 wherein the delivery vehicle is powdered bone, tricalcium phosphate, hydroxyapatite, polymethacrylate, a biodegradable polyester, an aqueous polymeric gel, or a fibrin sealant.

3. The method of claim 1 wherein the composition is locally administered at a site of a bony defect.

4. The method of claim 3 werein the bony defect is a fracture, bone graft site, implant site, or periodontal pocket.

5. The method of claim 1 wherein the composition is administered systemically.

6. The method of claim 1 wherein the dimeric protein is covalently linked to a bone-targetting agent.

7. The method of claim 1 wherein the composition is locally administered at a joint.

8. The method of claim 1 wherein the composition further comprises a protein selected from the group consisting of insulin-like growth factor 1, platelet-derived growth factor, epidermal growth factor, transforming growth factor-alpha, transforming growth factor-beta, a bone morphogenetic protein, parathyroid hormone, osteoprotegerin, a fibroblast growth factor, and a protein comprising residues 258-370 of SEQ ID NO:5.

9. The method of claim 1 wherein the protein is a homodimer.

10. The method of claim 9 wherein the protein comprises a first polypeptide chain disulfide bonded to a second polypeptide chain, each of said chains consisting of residues X-345 of SEQ ID NO:2, wherein X is an integer from 226 to 235, inclusive.

11. A method for promoting growth of bone, ligament, or cartilage in a mammal comprising administering to said mammal a composition comprising:

a pharmacologically effective amount of a dimeric protein comprising a first polypeptide chain disulfide bonded to a second polypeptide chain, each of said chains comprising of residues 235-345 of SEQ ID NO:2 or SEQ ID NO:4; and

a pharmaceutically acceptable delivery vehicle.

12. The method of claim 11 wherein each of said chains consists of residues X-345 of SEQ ID NO:2, wherein X is an integer from 226 to 235, inclusive.

13. The method of claim 11 wherein each of said chains consists of residues X-345 of SEQ ID NO:2, wherein X is an integer from 15 to 20, inclusive.

14. A method for promoting proliferation or differentiation of cells comprising culturing the cells in an effective amount of a dimeric protein comprising residues 235-345 of SEQ ID NO:2 or SEQ ID NO:4, wherein the cells are osteoblasts, osteoclasts, chondrocytes, or bone marrow stem cells.

15. The method of claim 14 wherein the cells are bone marrow stem cells and wherein the method comprises harvesting the bone marrow stem cells from a patient prior to culturing.

16. The method of claim 14, further comprising the step of recovering osteoblasts, osteoclasts, or chrodrocytes from the cultured cells.

17. The method of claim 14 wherein the protein comprises a first polypeptide chain disulfide bonded to a second polypeptide chain, each of said chains consisting of residues X-345 of SEQ ID NO:2, wherein X is an integer from 226 to 235, inclusive.

18. A method for promoting cartilage growth comprising:

culturing chondrocytes *ex vivo* in the presence of a dimeric protein comprising residues 235-345 of SEQ ID NO:2 or SEQ ID NO:4 under conditions wherein the chondrocytes proliferate; and

placing the cultured chondrocytes into a mammal where cartilage is to be grown.

19. The method of claim 18 wherein the chondrocytes are placed into the mammal in association with a biodegradable matrix having sufficient porosity to permit cell ingrowth.

20. The method of claim 19 wherein the matrix comprises a protein selected from the group consisting of, insulin-like growth factor 1, platelet-derived growth factor, epidermal growth factor, transforming growth factor-alpha, transforming growth factor-beta, a bone morphogenetic protein, parathyroid hormone, a fibroblast growth factor, a dimeric protein comprising residues 235-345 of SEQ ID NO:2 or SEQ ID NO:4, and a protein comprising residues 258-370 of SEQ ID NO:5.

21. The method of claim 18 wherein the protein comprises a first polypeptide chain disulfide bonded to a second polypeptide chain, each of said chains consisting of residues X-345 of SEQ ID NO:2, wherein X is an integer from 226 to 235, inclusive.

22. A method for stimulating proliferation of osteoblasts or chondrocytes in a mammal comprising administering to the mammal a composition comprising:

a pharmacologically effective amount of a dimeric protein comprising residues 235-345 of SEQ ID NO:2 or SEQ ID NO:4; and

a pharmaceutically acceptable delivery vehicle.

23. The method of claim 22 wherein the delivery vehicle is powdered bone, tricalcium phosphate, hydroxyapatite, polymethacrylate, a biodegradable polyester, an aqueous polymeric gel, or a fibrin sealant.

24. The method of claim 22 wherein the protein is covalently linked to a bone-targetting agent.

25. The method of claim 22 wherein the composition further comprises a protein selected from the group consisting of insulin-like growth factor 1, platelet-derived growth factor, epidermal growth factor, transforming growth factor-alpha, transforming growth factor-beta, a bone morphogenetic protein, parathyroid hormone, osteoprotegerin, a fibroblast growth factor, and a protein comprising residues 258-370 of SEQ ID NO:5.

26. The method of claim 22 wherein the protein comprises a first polypeptide chain disulfide bonded to a second polypeptide chain, each of said chains consisting of residues X-345 of SEQ ID NO:2, wherein X is an integer from 226 to 235, inclusive.